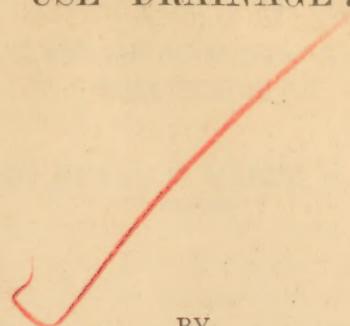


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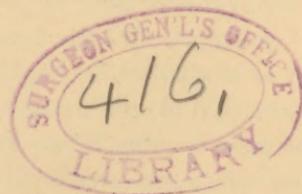
IN WHAT CLASS OF WOUNDS SHALL WE USE DRAINAGE?



BY

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IN WHAT CLASS OF WOUNDS SHALL WE USE DRAINAGE?

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IT has been stated upon high authority that the drainage of wounds marked an era of advance in the methods of wound-treatment equal to that of the introduction of antiseptics.

The differences of opinion which still pertain are so marked that the question of drainage in operative wounds is one of primal consideration, and I have presumed to call attention to it, in the hope that our surgical science is, at least, so advanced as to permit the formulation of certain general rules for guidance.

It may be accepted that the object of drainage is to remove safely deleterious substances from a wound, which, if allowed to remain, will in a greater or less degree retard cure, or even endanger life. These substances may consist of blood, serum, devitalized tissues, and vital organisms, earlier known as ferments; various forms of bacteria, which utilize these materials as food and reproduce with a rapidity and in a degree almost beyond comprehension.

These growths not only become dangerous in themselves, but they generate a chemical poison, which in amount may be sufficient to produce death.

To what degree are the living tissues endowed with a resistant power for self-protection from such danger, is a question to be answered with difficulty, perhaps never subject to precise solution. It is settled beyond doubt that the healthy tissues have a resistant power to prevent, to a certain extent, the invasion of bacterial infection, and that this is in a more or less direct ratio to the physical vigor of the individual, age, condition, etc. It will also not be questioned, that an occasional bacterium implanted upon healthy tissues will not germinate, and it may be formulated that

when the vital resistant power is greater than that of the foreign element the latter will not thrive. Such illustrations are often met in wounds subject to local infection only, where the recovery is slow and the resulting abscess causes the expulsion of the foreign material, healthy granulating cells at length filling-in and uniting the tissues. It is also clearly established that this same vital force is quite capable of dealing with and in the end utilizing for repair considerable effusions of blood and serum, as well as broken-down tissues, as is so often seen in subcutaneous wounds, simple fractures, and other severe injuries. However, change the conditions, by the introduction of a micrococcal infection, as in a compound fracture, and no longer is this same resistant power able to save the general organism from serious danger; death results from septic poisoning.

From this brief review of well-known facts, it is obvious that the real object of drainage is not so much the removal of the serum, blood, and devitalized tissues, as it is to remove any possible bacterial infection which may have invaded the wound; for it is quite impossible to divide and rejoin tissues without the effusion of blood and serum, and in a greater or less degree devitalizing the adjacent structures.

Since these are very important factors, it is of the first consideration on the part of the surgeon, that he minimize as much as possible these conditions, for the reason that they render it very probable that the introduction of bacterial *seed* into such a *soil* will be followed by direful results.

Is the present state of operative procedures sufficiently accurate to warrant the assurance that such complications are not to supervene? This is the question which must first be satisfactorily answered before we are in a position to determine at all positively when we are to use, if always, or not at all, the drainage-tube, in the hope thereby to remove the fermenting material, so dangerous if allowed to remain.

It is certainly clear that the experience of the last twenty years has been leading to the solution of this problem, until now it seems demonstrated beyond a doubt, that an *aseptic* wound may be made in *aseptic* tissues, and maintained *aseptic* until restoration is complete. If this is true, the *modus operandi* of modern wound-treatment must be mastered as the ritual service of a higher religion, before the surgeon is competent to enter upon the serious responsi-

bilities of his office. This portion of the subject would lead me too far from the theme of present consideration, but fortunately the members of this Association need little instruction in this direction.

If aseptic conditions are maintained, then we may safely conclude that the drainage of the wound will not be necessary, and if unnecessary, certainly undesirable. At the best the drainage-tube is a foreign body, and its presence in the wound prevents primary union of that portion of the tissues which enclose it.

It keeps the wound, to a certain extent, an open one, and as such makes secondary infection so probable that the most careful anti-septic dressings are advised, to absorb and disinfect secretions and prevent atmospheric contamination.

In an aseptic wound, after the removal of the tube, the final closure of the tract is comparatively slow, and by granulation. These are well-recognized objections, and efforts have been made to overcome them by many ingenious devices. The decalcified bone drainage-tubes are of service to this end, since, after serving the purpose of a drain for a time, they soften, and, as broken-down material, escape into the dressings.

A modification of these tubes has been made by Dr. Weeks, of Portland, Maine, possessing certain advantages over bone, in the use of the arteries from animals which have been aseptically prepared. They serve an excellent purpose where such devices are required.

If drainage is to be discontinued in aseptic wounds, it must be accepted that the greatest care must be exercised in leaving as little devitalized tissues as possible, and in evenly coaptating the divided parts. The wound should be clean and dry; the different layers of the tissues should be joined with as little injury as possible, and the external wound protected from infection.

This I have found best carried into effect by irrigation, a minimum of sponging, and joining of the tissues by light, running, buried animal sutures, preferably tendon. The skin is evenly coaptated by a similar suture, taken from within outward through the deeper layer only.

Then the wound is sealed with a germ-proof layer of iodoform collodion reinforced by a few fibres of cotton. Such wounds go on rapidly to repair without edema of the tissues, pain, or tender-

ness ; the resultant cicatrix is minimized—of much importance in facial wounds—often after some weeks scarcely to be recognized.

Are all aseptic wounds to be thus treated ? I unhesitatingly say yes, even to the major amputations ; abdominal operations included.

Can such large wounds be made and maintained aseptic ? Without a doubt, as experience abundantly proves. The affirmative to such important questions, however, is undoubtedly to be maintained only by the most scrupulous of aseptic measures.

When in doubt, it may be better to drain large wounds, but I cannot myself question that he who uses the drainage-tube in aseptic wounds, unconsciously however it may be, thereby in a measure, at least, confesses his lack of confidence of his belief in, and ability to maintain, an aseptic condition of wounds.

The wound, which is cleansed with difficulty from blood, or where there may be possibly unsecured bleeding points, may become an exception to the above rule, even if aseptic ; but here the drainage-tube, when used, is for quite another purpose ; namely, to point out secondary hemorrhage, as after severe abdominal operations with many injured vessels. I cannot myself, however, doubt that it is far better to use especial precautions to control hemorrhage before the closure of the wound, rather than rely upon such an imperfect indicator of such a complication.

As a matter of fact, I find in my last forty abdominal sections I have not once used drainage, and have noted no reason to regret not employing it.

In septic wounds we have entirely other conditions, and here we shall find abundant reason for the use of drainage. In an abscess as an illustration, the proliferated wall of protective cells is often invaded by colonies of bacteria, and the washing with antiseptic solutions is not sufficient to destroy fermentation. Here it is of much importance to remove as rapidly as possible the albuminoid secretions and broken *débris*, to allow the cavity to contract ; and when this takes place, the surrounding tissues rapidly become of increased vitality, while the bacteria, robbed of nutrition, soon die and disappear. When tissues otherwise healthy have become contaminated by infective material, as, for instance, the rupture of a pus tube in the pelvic cavity, we can never be certain that our antiseptic washes, used at the time of operation, have disinfected all

the peritoneal folds, even if used with care. Here it may be sometimes wise to provide for the retention of antiseptics in the form of iodoform-gauze packing, or by means of double drainage-tubes to be prepared for further irrigation.

The irritation which follows severe operations will cause serous effusions, and this, with the blood and dead tissues always present to some degree, will furnish abundant pabulum for bacterial growth.

Here it is important not only to use a drainage-tube, but to be explicit in the care of the same for the first two days after the operation. Properly used, it should be long enough to reach to the bottom of the cavity—if the pelvis, to the posterior cul-de-sac. It should contain lateral openings, and the attendant in charge should, for the first hours, empty the same every few minutes by the syringe, or the use of absorbents—cotton on wire gently used answering every purpose. This makes, as it were, a continuous flow toward the bottom of the drain and removes the fluids before time for fermentation has elapsed. After twenty-four hours the quantity will have greatly diminished, and a capillary drain of gauze will be sufficient, changed occasionally. It is better, when all goes well, to remove the tube by the third day. Occasionally small portions of omentum are drawn into the openings of the drainage-tube by the suction, and thus closure takes place, but rotation of the tube is quite sufficient to disengage them. When tubes are used, antiseptic absorbent dressings are of importance, and position, as far as possible, should be made available in aiding the outflow of the secretions.

If the conclusions arrived at above are correct and based upon scientific data, in what way are we able to explain the great differences of opinion and practice at the present?

At the late International Congress in Berlin, both Mr. Tait and Dr. Bantock expressed their disbelief in germs as an important factor in wound-treatment, while they strongly urged the importance of the early and rapid removal of blood, serum, and devitalized tissues from wounds. On this account they not only use drainage-tubes as a common rule, but predicted their more general adoption in the early future. Mr. Tait emphasized, very properly, the power of the tissues to protect themselves, when vitalized, if placed in favorable conditions, and I take the greatest pleasure in seconding

his views. To use an illustration drawn from agriculture, I hold that the proper care of the soil is important; while I trust he will not be forgetful of the seed, which is, after all, the most important factor in the direful harvest.

The conditions for growth must be fitting. To destroy weeds, as well as to grow the grain, a primal knowledge of their reproduction is necessary. As well think of reading an essay upon agriculture over a peck of corn poured upon Boston Common, and expect an abundant harvest, as to look confidently for good results in wound-treatment without a knowledge of all its possible factors.

The *seed* and the *soil*, and the varying conditions of each, must ever be kept in consideration. When in doubt of infection in a wound, especially when its character will be likely to be attended with an abundant albuminoid secretion, drain; but let the surgeon ever remember that the highest theoretic condition of wounds, is their restoration, as nearly as possible, to the normal relation of the tissues, and their retention at rest in an aseptic condition.

This, in a great majority of wounds, renders drainage not only unnecessary, but when applied, it will be a positive detriment and a source of danger.

Complete closure of an aseptic wound by aseptic buried animal sutures, retained at rest by a germ-proof dressing, comes nearer to the ideal than any method yet advised.

There is no fear of hemorrhage in an aseptic wound thus closed. There is no further danger from infection, clumsy antiseptic dressings are entirely avoided, little subsequent care is requisite on the part of the surgeon or attendant; and the patient is relieved of fear from subsequent suffering in the removal of stitches, is free from pain, and goes on to a rapid convalescence.

I am assured that the better knowledge of the conditions of wounds will restrict the use of the drainage-tube to septic wounds, and that operative wounds in aseptic tissues will be aseptically maintained by primary closure without drainage.